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Abstract

PURPOSE:To prevent the contamination of a protective film by impurities and the deterioration of element characteristics, to prevent the lowering of yield of production as well as to easily obtain a method in which a treatment solution will be reused by a method wherein, after a substrate and liquid gas or supercritical gas have been contacted with each other, the gas is expanded by changing its temperature and/or the condition of pressure.

CONSTITUTION:After a substrate, whereon an organic coated and hardened film is joined together, and liquefied gas or supercritical gas have been contacted, the gas is expanded by changing its temperature and/or the condition of pressure. Non-oxidizing gas such as CO_2, NH_3, N_2 and the like can be used as liquefied gas or supercritical gas, but CO_2 is suitable taking into consideration of advantages in cost and operation. Also, a gaseous organic solvent can be used at the normal temperature, and propane, butane, methyl chloride and the like can be used as the organic solvent. When liquefied carbonic acid gas is used, as it is hardly infiltrated completely into the interior of the organic coated and hardened film and the like such as a photoresist coated film, or on the interface between said films and the substrate, it is desirable in this case that an organic solvent of high solubility is mixed into carbonic acid gas.